

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA
OAKLAND DIVISION

EPIC GAMES, INC.,

Plaintiff, Counter-defendant,

vs.

APPLE INC.,

Defendant, Counterclaimant.

No. 4:20-CV-05640-YGR-TSH

**WRITTEN DIRECT TESTIMONY OF
DOMINIQUE HANSENS, PH.D.**

Trial Date: May 3, 2021

Time: 8:00 a.m.

Courtroom: 1, 4th Floor

Judge: Hon. Yvonne Gonzalez Rogers Ex.

Ex. Expert 10

I. Summary of Opinions

1. **Device Usage Opinions:** I conducted two surveys following standard survey research practices. In both of my surveys, the vast majority of respondents—who were all iPhone and iPad users in the U.S.—regularly used or could have regularly used at least one of the following types of devices in the last 12 months: smartphones and tablets not manufactured by Apple, desktops and laptops manufactured by Apple and others, gaming consoles, and handheld gaming devices. These are all devices on which a user can access digital gaming content. ¶¶ 5–20.

- a. **Opinion 1.** Results of my first survey show that 92 percent of respondents who downloaded apps from the App Store had regularly used at least one *other* type of device (*i.e.*, devices other than iPhones and iPads) with which they could access digital gaming content, in the last 12 months. Further, 99 percent of respondents in the first survey had regularly used or could have regularly used at least one *other* type of device (*i.e.*, devices other than iPhones and iPads) with which they could access digital gaming content, in the last 12 months. ¶ 16
- b. **Opinion 2.** Similarly, results of my second survey show that 97 percent of respondents who played *Fortnite* on their iPhones and iPads had regularly used at least one *other* type of device (*i.e.*, devices other than iPhones and iPads) with which they could access digital gaming content, in the last 12 months. Further, 99 percent of respondents in the second survey had regularly used or could have regularly used at least one *other* type of device (*i.e.*, devices other than iPhones and iPads) with which they could access digital gaming content, in the last 12 months. ¶ 17
- c. **Opinion 3.** The vast majority of respondents who played *Fortnite* on their iPhones and/or iPads (94 percent) played digital games on at least one *other* type of device (*i.e.*, devices other than iPhones and iPads), in the last 12 months. ¶ 17.

2. **Rossi Survey/Results Opinions:** Professor Rossi conducted a survey of U.S. consumers to measure how they would respond to a hypothetical five percent price increase to “in-app purchases and subscriptions when purchased from within iOS apps.”¹ In my review of Professor Rossi’s survey, I found that he failed to follow established practices for survey research, and his questionnaire design choices introduced known sources of response bias. The results of his survey are therefore biased and unreliable, and analyses (such as Professor Rossi’s price elasticity calculations) that rely on these biased data are themselves biased and unreliable.

¶¶ 21–60. Specifically, Professor Rossi:

- a. **Opinion 4.** Excluded from his survey an important segment of digital game consumers (those aged 13 to 16), and an important segment of in-app purchase and subscription consumers (those who had made in-app purchases or bought subscriptions outside the 30-day window prior to the survey). ¶ 29.

¹ Written Direct Testimony of Peter E. Rossi, Ph.D. (“Rossi”), ¶ 2.

- b. **Opinion 5.** Created a hypothetical price increase scenario that was confusing and likely biased respondents toward keeping the same purchases under the hypothetical price increase. ¶ 37.
- c. **Opinion 6.** Made multiple, significant revisions to resolve respondent confusion about the hypothetical price increase scenario, but did not interview a single survey taker to determine if those sources of confusion were actually resolved (*i.e.*, he did not pretest his final survey instrument). ¶ 34.
- d. **Opinion 7.** Failed to provide a clear and complete set of choices respondents could make to shift payments from the App Store, and likely understated the proportion of real-world consumers who would switch to paying for in-app purchases and subscriptions through means other than the App Store to reduce spending. ¶ 54.

II. Background and Qualifications

3. I am a Distinguished Research Professor of Marketing at the UCLA Anderson School of Management. My research focuses on strategic marketing problems, to which I apply expertise in data-analytical methods, such as surveys, econometrics, and time-series analysis. From 2005 to 2007, I served as the Executive Director of the Marketing Science Institute in Cambridge, Massachusetts. The American Marketing Association awarded me the Churchill Award (2007) and the Mahajan Award (2013) for Career Contributions to Marketing Research and Marketing Strategy, respectively. The INFORMS Society for Marketing Science elected me as a Fellow (2010) and awarded me the Buck Weaver Award (2015) for lifetime contributions to the theory and practice of marketing.

4. My assignments and opinions in this matter were described in an opening expert report dated February 16, 2021, and a rebuttal report, dated March 15, 2021. I designed and conducted two device usage surveys. I also reviewed and evaluated the reliability of the survey instrument designed and implemented by Epic's survey expert, Professor Rossi, and the validity and reliability of his survey results. This is my direct testimony as if I were in court testifying in person, and is given under penalty of perjury.

III. iOS App Survey and iOS *Fortnite* Survey

5. I was asked to assess the use of or access to devices *other than* Apple smartphones and tablets ("iOS Devices") on which users can access digital gaming content ("Other Electronic Devices")² by two specific populations: iOS Device users in the United States who visited the

² "Other Electronic Devices" or "Other Electronic Device" include smartphones and tablets other than iOS Devices, personal computers (desktops and laptops, including such products manufactured by Apple), gaming consoles, and handheld gaming devices. *See* Complaint for Injunctive Relief, *Epic Games, Inc. v. Apple Inc.*, U.S. District Court for the Northern District of California, Civil Action No. 4:20-CV-05640-YGR, August 13, 2020, ¶ 23. ("Epic has developed several popular entertainment software products that can be played on an array of platforms—such as personal computers, gaming consoles, and mobile devices.").

App Store and downloaded apps (“iOS App Store Users”), and iOS Device users in the United States who played *Fortnite* on their iOS Devices (“iOS *Fortnite* Players”).³ I was also asked to assess whether iOS *Fortnite* Players use Other Electronic Devices to play digital games. To carry out this assignment, I conducted two surveys targeting the two different populations identified above (“iOS App Survey” and “iOS *Fortnite* Survey,” respectively).

A. Surveys’ Design and Implementation

6. In designing and implementing my surveys, I followed standard scientific methods to ensure the reliability of the results, including (but not limited to): identifying the population of interest and generating a sample that is representative of that population; minimizing or eliminating bias in questionnaire design (*e.g.*, potential biases stemming from question wording, ordering of questions, or answer choices); ensuring high-quality answers (*e.g.*, by avoiding confusion or guessing by respondents); and using measures to ensure data integrity (*e.g.*, attention check questions and decoys). I also conducted rigorous pretests of both surveys, which involved interviews of each pretest participant about the survey they took by a professional survey interviewer who was not privy to the purpose of the survey. The results of the pretests showed that respondents understood the questions as I intended and had no difficulty providing answers.

7. I used an online panel to field the two surveys and applied measures to ensure that each of my samples was representative of the relevant target populations. For the iOS App Survey, I required that the demographics of respondents who started the survey were representative of the U.S. Census demographics in terms of age, gender, and geographic region (commonly referred to by survey practitioners as “click balancing”). For the iOS *Fortnite* Survey, I imposed demographic quotas for age and gender to ensure that the demographics of respondents were representative of the *Fortnite* players’ known demographics, and applied geographic quotas representative of the U.S. Census demographics. The sample for both surveys included respondents aged 13 or older. People younger than 18 commonly access digital gaming content on a variety of devices. Further, *Fortnite* is deemed suitable for users aged 13 and older, and the 13 to 16 year old demographic comprises a significant part of the population of *Fortnite* players. Therefore, it was important to include this younger demographic group in the sample. Parental consent was obtained for all survey participants under 18 years old.

8. In the screening section of the surveys, I asked respondents a series of questions to identify those who met the criteria for the target population. In particular, I asked respondents to identify the types of devices they regularly used in the last 12 months (the list included smartphones, tablets, and “decoy” electronic devices). I then asked respondents who indicated they regularly used a smartphone or tablet in the last 12 months to identify the operating systems of these devices from a list. I asked the question separately for smartphones and tablets, but the

³ Further, for iOS App Store Users, I was asked to collect information about paid app purchases and in-app purchase behavior on iOS Devices. For iOS *Fortnite* Players, I was asked to collect information about their in-app purchase behavior when playing *Fortnite* on their iOS Devices.

choices of operating systems were identical. To ensure respondents could respond accurately, I provided examples of popular smartphone and tablet models for each operating system. **Exhibit 1** shows the question posed to respondents who indicated that they had regularly used a smartphone in the last 12 months. Respondents who did *not* select “Apple iOS” as the operating system for either a smartphone or tablet were terminated.

Exhibit 1

You indicated that you have regularly used **smartphones** in the last 12 months. Next, we would like to understand the operating system(s) of these smartphone(s). An operating system is software that allows smartphones to run mobile applications (also referred to as apps) and programs.

Which of the following **operating systems**, if any, represent the operating system(s) of the **smartphone(s)** that you have **regularly used in the last 12 months**?

Select all that apply.

☐ Android operating system

- Smartphones manufactured by Samsung, Google, HTC, LG, Motorola, Huawei, and others, such as Samsung Galaxy, Google Pixel, LG Velvet phones use this operating system

☐ Apple iOS operating system

- Smartphones manufactured by Apple such as iPhone 12, iPhone XR, iPhone SE phones use this operating system

☐ Microsoft Windows operating system

- Smartphones manufactured by Microsoft such as Microsoft Lumia 550, Microsoft Lumia 650, Microsoft Lumia 950 phones use this operating system

☐ None of the above

☐ Don't know / not sure

NEXT

Source: DX-4871.012; DX-4875.012

9. In the iOS App Survey, I asked respondents to indicate whether they had visited the App Store to download apps on the iOS Devices they regularly used in the last 12 months. To ensure that they could not guess the criterion for continuing with the survey, I included several “decoy” activities, such as listening to music, editing digital photographs or images, and streaming and watching videos, as seen in **Exhibit 2** below. Respondents who did *not* indicate that they had downloaded apps on the iOS Devices they regularly used in the last 12 months were terminated.

Exhibit 2

The screenshot shows a survey interface with a light gray background. At the top, a text block reads: "You indicated that you have regularly used Apple smartphones (iPhones) and Apple tablets (iPads) in the last 12 months. We will refer to these as the Apple mobile devices you have regularly used in the last 12 months." Below this, a question asks: "Which of the following activities, if any, did you do on the **Apple mobile devices (iPhones and iPads)** you have **regularly used in the last 12 months**?" A sub-instruction says "Select all that apply." There are five options, each with a checkbox or radio button: "Edited digital photographs or images", "Listened to music", "Streamed and watched videos", "Visited Apple's App Store and downloaded / installed app(s)", "None of the above", and "Don't know / not sure". A teal "NEXT" button is in the bottom right corner.

You indicated that you have regularly used Apple smartphones (iPhones) and Apple tablets (iPads) in the last 12 months. We will refer to these as the Apple mobile devices you have regularly used in the last 12 months.

Which of the following activities, if any, did you do on the **Apple mobile devices (iPhones and iPads)** you have **regularly used in the last 12 months**?

Select all that apply.

- ☐ Edited digital photographs or images
- ☐ Listened to music
- ☐ Streamed and watched videos
- ☐ Visited Apple's App Store and downloaded / installed app(s)
- ☐ None of the above
- ☐ Don't know / not sure

NEXT

Source: DX-4871.014

10. In the iOS *Fortnite* Survey, I asked respondents to identify which games they had played on the iPhones and/or iPads they had regularly used in the last 12 months. As seen in **Exhibit 3**, I provided respondents a list of games based on lists of popular games available on iOS Devices that covered a mix of gaming genres (including *Fortnite*). As an additional quality assurance measure, I included three fake “decoy” games (“Sands of Alethkar,” “Guard Dogs,” and “Sword of Radch”) to catch respondents who were either not paying attention or were trying to guess the criterion for continuing with the survey. Respondents who did *not* select *Fortnite*, as well as those that selected any of the “decoy” games, were terminated.

Exhibit 3

Which of the following games, if any, have you played on any of the **Apple mobile devices (iPhones and iPads)** you have **regularly used in the last 12 months?**

Select all that apply.

- ☐ Sword of Radch
- ☐ Call of Duty: Mobile
- ☐ Minecraft
- ☐ PUBG Mobile
- ☐ Bloons TD 6
- ☐ Monopoly
- ☐ NBA 2K20
- ☐ Guard Dogs
- ☐ Fortnite
- ☐ Sands of Alethkar
- ☐ Among Us!
- ☐ Rocket Royale
- ☐ Roblox
- ☐ None of the above
- ☐ Don't know / not sure

NEXT

Source: DX-4875.015

11. Across both surveys, for respondents who qualified for the main questionnaires and had regularly used both a smartphone and a tablet in the last 12 months, I asked about other smartphones and tablets they indicated they had *not* regularly used in this time frame. In these questions, respondents were shown only types of smartphones and tablets they did *not* indicate regularly using in the screener section. **Exhibit 4** below provides an example of the question posed for iPhone users. In this question, I asked respondents to indicate whether (1) this type of device was available for them to regularly use, but they did not regularly use it in the last 12 months; or (2) this type of device was not available for them to regularly use in the last 12 months. I also provided an example for devices available to regularly use, as seen in **Exhibit 4**.

Exhibit 4

You previously indicated that, in the last 12 months, you have regularly used **smartphone(s)** with the following operating system(s): **Apple iOS operating system**.

Next, we are interested in understanding what **other types of smartphones**, if any, were available for you to regularly use in the last 12 months but that you did not regularly use. An example would be the smartphone of a member of your household or of a friend that you could have regularly used but that you did not regularly use in the last 12 months.

If this does not apply to your situation in the last 12 months, you can select "This type of device was not available for me to regularly use in the last 12 months."

Select one answer for each row.

Smartphone Operating System	This type of device was <u>not available</u> for me to regularly use in the last 12 months	This type of device was available for me to regularly use, but I did <u>not</u> regularly use it in the last 12 months
Android phone	<input type="radio"/>	<input type="radio"/>
Microsoft Windows phone	<input type="radio"/>	<input type="radio"/>

NEXT

Source: DX-4871.018; DX-4875.021

12. The next question in both surveys probed respondents about a larger set of Other Electronic Devices they regularly used or could have regularly used in the last 12 months. I provided respondents five different types of electronic devices, and included examples of the most popular brands for each device type. As seen below in **Exhibit 5**, I asked respondents to indicate whether (1) they regularly used this type of device in the last 12 months; (2) this type of device was available for them to regularly use, but they did not regularly use it in the last 12 months; or (3) this type of device was not available for them to regularly use in the last 12 months. I also included a “Don’t know / not sure” option for each type of device.

Exhibit 5

Next, we would like to understand what **other types of electronic devices**, if any, you have **regularly used in the last 12 months**. For each device type, we would like to know:

- If you have regularly used that type of device in the last 12 months,
- If you have not regularly used that type of device in the last 12 months but the device was available for you to regularly use if you wanted to (an example would be the device of a member of your household or of a friend that you could have regularly used but that you did not regularly use in the last 12 months).

If none of these apply to your situation in the last 12 months, you can select “This type of device was not available for me to regularly use in the last 12 months.”

The devices we will ask you about are the following:

- Apple Laptop:
 - All laptops manufactured by Apple, such as MacBook Air, MacBook Pro
- Laptop brands other than Apple:
 - All laptops from manufacturers other than Apple, such as Dell, Lenovo, Samsung, and others
- Apple Desktop:
 - All desktops manufactured by Apple, such as iMac Pro, Mac Mini
- Desktop brands other than Apple:
 - All desktops from manufacturers other than Apple, such as HP, Acer, ASUS, and others
- Gaming console or handheld gaming device:
 - Gaming devices manufactured by brands such as PlayStation, Xbox, Nintendo, and others

Select one answer for each row.

Device Type	I have regularly used this type of device in the last 12 months	This type of device was available for me to regularly use, but I did not regularly use it in the last 12 months	This type of device was <u>not available</u> for me to regularly use in the last 12 months	Don't know / not sure
Desktop brands <u>other</u> than Apple	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Apple laptop	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Laptop brands <u>other</u> than Apple	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Gaming console or handheld gaming device	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Apple desktop	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

NEXT

Source: DX-4871.020; DX-4875.023

13. I posed questions about devices that respondents used or could have used “in the last 12 months” in both of my surveys to reduce the impact of seasonality and other idiosyncratic circumstances on device usage patterns. I asked respondents about “regular use” to narrow the relevant universe of devices to a set that respondents could easily identify as those they actually used or those they could have used on a regular basis (and exclude devices that they would rarely or occasionally use). Due to the natural variation in the frequency of device use between

respondents and/or devices, this framing also allowed flexibility for respondents to be able to identify devices appropriately based on what regular use would mean for each of them and for each of their relevant devices.

14. Similarly, I used the term “available” when I asked about devices respondents did not regularly use but could have regularly used if they wanted to. In all questions using this term, I provided respondents with a simple example to further ensure what I was asking was clear. I pretested both surveys and confirmed that pretest participants did not have difficulty identifying the devices they had regularly used or could have regularly used in the last 12 months.

15. In the iOS *Fortnite* Survey, I asked respondents to identify whether they played games on the Other Electronic Devices they identified as having regularly used in the last 12 months (*see Exhibit 6*). I did not include iPhones and/or iPads in the list since I already asked the respondents in the screening questions about their gaming behavior on their iOS Devices (*see Exhibit 3*). I also did not include gaming consoles and/or handheld gaming devices in the list to avoid confusion among respondents as to why they were being asked whether they played games on gaming devices. When I analyzed the share of respondents who used Other Electronic Devices to play games, I implicitly assumed that respondents who regularly used a gaming device, used the device to play games. While consumers may use these devices for multiple purposes in addition to playing games (such as watching streamed shows and movies), these devices are marketed as designed specifically for gaming activity, so it is reasonable to assume that the vast majority of, if not all, users of these devices would use them to play games.

Exhibit 6

Which of the following devices, if any, did you use to **play games** in the last 12 months?
Select all that apply.

- ☐ Apple laptop
- ☐ Desktop brands other than Apple
- ☐ Laptop brands other than Apple
- ☐ Apple desktop
- ☐ None of the above
- ☐ Don't know / not sure

NEXT

Source: DX-4875.026

B. Survey Results

16. In my iOS App Survey, I found the vast majority of iOS App Store Users regularly used Other Electronic Devices in the last 12 months (*see Exhibit 7* below). In particular:

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Dominique Hanssens, Ph.D.

- 92 percent of iOS App Store Users had regularly used at least one type of Other Electronic Devices in the last 12 months;
- 81 percent of iOS App Store Users had regularly used at least one type of Other Electronic Devices not manufactured by Apple in the last 12 months;
- 99 percent of iOS App Store Users had regularly used or could have regularly used at least one type of Other Electronic Devices in the last 12 months;
- 95 percent of iOS App Store Users had regularly used or could have regularly used at least one type of Other Electronic Devices not manufactured by Apple in the last 12 months;
- 41 percent of iOS App Store Users indicated that they had regularly used gaming consoles and/or handheld gaming devices in the last 12 months; and
- 61 percent of iOS App Store Users indicated that they had regularly used or could have regularly used gaming consoles and/or handheld gaming devices in the last 12 months.

Exhibit 7

Other Electronic Devices Used or Available to Use by iOS App Store Users (Share of Respondents)

Device	Regularly Used This Device in the Last 12 Months	Regularly Used This Device or Device Was Available to Regularly Use in the Last 12 Months
Smartphones with Non-iOS Operating Systems	27%	56%
Android	22%	49%
Microsoft	13%	30%
Tablets with Non-iOS Operating Systems	23%	48%
Android	18%	41%
Microsoft	11%	31%
Laptops	71%	86%
Apple	36%	47%
Brands Other Than Apple	50%	68%
Desktops	48%	64%
Apple	22%	35%
Brands Other Than Apple	36%	53%
Gaming Consoles and/or Handheld Gaming Devices	41%	61%
Nintendo Switch (including Nintendo Switch Lite)	21%	—
PlayStation (PS Series Console)	25%	—
Xbox	21%	—
Nintendo DS Series	10%	—
PlayStation Vita	6%	—
GPD XD Plus	1%	—
Other Electronic Devices	92%	99%
Other Electronic Devices (Non-Apple)	81%	95%

Source: DX-4714

17. In the iOS *Fortnite* Survey, I found that the vast majority of iOS *Fortnite* Players regularly used Other Electronic Devices in the last 12 months and regularly used these devices to play games (see **Exhibit 8** below). In particular:

- 97 percent of iOS *Fortnite* Players regularly used at least one type of Other Electronic Devices in the last 12 months;
- 94 percent of iOS *Fortnite* Players regularly used at least one type of Other Electronic Devices not manufactured by Apple in the last 12 months;
- 99 percent of iOS *Fortnite* Players regularly used or could have regularly used at least one type of Other Electronic Devices in the last 12 months;
- 99 percent of iOS *Fortnite* Players regularly used or could have regularly used at least one type of Other Electronic Devices not manufactured by Apple in the last 12 months;
- 79 percent of iOS *Fortnite* Players indicated that they regularly used gaming consoles and/or handheld gaming devices in the last 12 months;
- 90 percent of iOS *Fortnite* Players indicated that they regularly used or could have regularly used gaming consoles and/or handheld gaming devices in the last 12 months; and
- 94 percent of iOS *Fortnite* Players played games on at least one type of Other Electronic Device in the last 12 months.

Exhibit 8

Other Electronic Devices Used or Available to Use and Other Electronic Devices Used to Play Games by iOS Fortnite Players (Share of Respondents)

Device	Regularly Used This Device in the Last 12 Months	Regularly Used This Device or Device Was Available to Regularly Use in the Last 12 Months	Used This Device to Play Games in The Last 12 Months
Smartphones with Non-iOS Operating Systems	38%	72%	27%
Android	28%	62%	22%
Microsoft	19%	43%	8%
Tablets with Non-iOS Operating Systems	33%	67%	18%
Android	25%	55%	14%
Microsoft	16%	40%	7%
Laptops	80%	91%	57%
Apple	44%	56%	28%
Brands Other Than Apple	59%	78%	37%
Desktops	59%	76%	41%
Apple	30%	46%	16%
Brands Other Than Apple	48%	66%	31%
Gaming Consoles and/or Handheld Gaming Devices	79%	90%	79%
Nintendo Switch (including Nintendo Switch Lite)	42%	–	42%
PlayStation (PS Series Console)	55%	–	55%
Xbox	49%	–	49%
Nintendo DS Series	20%	–	20%
PlayStation Vita	11%	–	11%
GPD XD Plus	2%	–	2%
Other Electronic Devices	97%	99%	94%
Other Electronic Devices (Non-Apple)	94%	99%	90%

Source: DX-4663; DX-4754

18. I performed sensitivity analyses and robustness checks of my results in **Exhibits 7 and 8** above. In particular:

- a. I recalculated the results for three mutually exclusive subsets of respondents: those who regularly use both an iPhone and an iPad, those who regularly use an iPhone only, and those who regularly use an iPad only.
- b. I recalculated the results after I excluded sets of respondents whose responses might indicate they were inattentive: respondents who completed the survey too quickly or too slowly,⁴ and respondents who indicated they regularly used or could have regularly used smartphones operated by a Windows Microsoft operating system.

⁴ I used two different methods for the robustness test with respect to time spent completing the survey. First, I excluded respondents who were outliers in terms of overall survey completion time between all respondents (for the iOS App Survey, this was defined as those who completed the survey in under two minutes or in fourteen minutes or more; for the iOS *Fortnite* Survey, this was defined as those who completed the survey in under two minutes or in sixteen minutes or more). Second, I excluded respondents who completed the survey in under three minutes.

19. These changes had no material impact on the results of my surveys, as I still found that the vast majority of respondents regularly used or could have regularly used Other Electronic Devices in the last 12 months, and that the vast majority of iOS *Fortnite* Players regularly used Other Electronic Devices to play games. Even if certain survey respondents are removed from the analysis, my overall results and conclusions do not change in a meaningful way.

20. Professor Rossi's survey data about device usage corroborate the main results of my surveys. Professor Rossi asked his survey respondents to indicate which (if any) of the following types of devices they used: smartphones (Q7), tablets (Q8), computers / laptops (Q12), and gaming consoles (Q13).⁵ Analysis of these responses shows that the vast majority of Professor Rossi's respondents used Other Electronic Devices (*see Exhibit 9*).⁶

Exhibit 9

Device Usage by Professor Rossi's Survey Respondents

Device	Professor Rossi's Respondents
Any Other Electronic Devices	98%
Any Other Electronic Devices (Non-Apple)	93%

Source: Summarizing PX-2545

IV. Professor Rossi's Survey Methodology Was Flawed and His Results Are Unreliable

21. I was also asked to review and evaluate the reliability of Professor Rossi's survey instrument and the validity and reliability of his survey results.

22. Professor Rossi designed and fielded a survey of U.S. residents aged 17 and older using a sample limited to respondents who had used an iOS Device and made in-app purchases or purchased subscriptions through the App Store in the 30 days before taking the survey.⁷ The main goal of Professor Rossi's survey was to measure how consumers would react to a hypothetical price increase scenario.⁸ To achieve this, Professor Rossi asked respondents how they might have reacted had there been a five percent increase hypothetically applied to the prices of the in-app purchases and subscriptions respondents had made in the past 30 days on their iOS Devices.

23. Academic research demonstrates that survey respondents' predictions about how they would have changed their behavior in a hypothetical situation (especially in relation to prices)

⁵ PX-2547.8–9; 15–16.

⁶ While Professor Rossi's target population and his questions are different from mine, these survey responses provide relevant insights into the device usage question my surveys address.

⁷ Rossi, ¶ 4.

⁸ Rossi, ¶ 2.

are not reliable indicators of their actual behavior, and that such survey methods generate unreliable responses. Further, as I describe below, Professor Rossi's survey generated biased and unreliable responses because he failed to follow standard survey practices in conducting his survey, including not pretesting his final survey instrument. Even if Professor Rossi's survey results were reliable, which they are not, they are not generalized to the broader population he was asked to target in his assignment. Furthermore, the results cannot be generalized to any hypothetical price increase scenario other than the five percent price increase he tested.

A. The Stated Preference Survey Method that Professor Rossi Used Is Widely Regarded as Unreliable

24. Professor Rossi asked respondents to predict how they might have changed their purchasing behavior for “at-issue purchases”⁹ made in the last 30 days on the App Store in response to a hypothetical price increase of five percent.

25. Academic research documents the gap between actual behavior and survey respondents' statements as to how they would behave (*i.e.*, their stated preferences). One explanation for this well-documented disconnect is known as “hypothetical bias,” or respondents' inability to reliably predict their behavior in hypothetical situations for which they do not have enough real-world context to tie their responses to their actual behavior. As Professor Jerry Hausman of MIT noted, “put simply, what people say is different from what they do.”¹⁰

26. Professor Rossi has also acknowledged that simply asking respondents to predict their behavior yields unreliable results¹¹ and has advocated for the use of other survey methods, such as choice-based conjoint,¹² to avoid the use of stated preference data. Professor Rossi states in one publication that “[v]irtually all researchers in marketing accept the premise that choice-based conjoint studies offer superior recovery of consumer preferences than a *pure stated preference method in which direct elicitation of preferences is attempted*.”¹³

27. However, here Professor Rossi used a “pure stated preference method,” asking respondents to predict how they might have changed their behavior in a hypothetical situation involving a price increase.

⁹ Professor Rossi defines “at-issue purchases” as “in-app purchases and subscriptions when purchased from within iOS apps.” Rossi, ¶ 2.

¹⁰ J. Hausman (2012), “Contingent Valuation: From Dubious to Hopeless,” *Journal of Economic Perspectives*, 26, 4, 43–56 at p. 44.

¹¹ See, for example, Rossi, P. E., G. Allenby, and N. Hardy (2019), “Economic Foundations of Conjoint Analysis,” in *Handbook of the Economics of Marketing*, Rossi, P.E. and J. P. Dube, eds. Oxford, United Kingdom: Elsevier, 151–192 (“Rossi et al.”) at pp. 152–154; DX-4942.

¹² A conjoint survey is a survey method pursuant to which the researcher analyzes trade-offs respondents make when choosing between different products given various choices to infer their preferences.

¹³ Rossi et al. at pp. 152–153. Emphasis added; DX-4942.

B. Professor Rossi's Survey Results Are Not Generalizable to the Broader Population He Was Asked to Study

28. Even if the results of Professor Rossi's survey were reliable, which they are not, they are not generalizable either to iOS Device users younger than 17 years old or to iOS Device users who made in-app purchases or subscriptions outside the 30-day window of Professor Rossi's survey.

29. Professor Rossi's target population (U.S. residents aged 17 and older who have used an iOS device and have made at-issue purchases in the past 30 days¹⁴) does not match the population of U.S. consumers who make in-app purchases or buy subscriptions on iOS Devices because:

- It excludes the important segment of 13 to 16 year-olds, despite the fact that this demographic group comprises a significant part of the population of *Fortnite* players.¹⁵ Younger buyers may have a different price elasticity than those included in Professor Rossi's survey. Further, Professor Rossi provides no evidence that younger buyers do not make the purchase decisions for their at-issue purchases.
- It excludes individuals who make in-app purchases and subscriptions but who did *not* do so in the 30 days before Professor Rossi's survey. Infrequent buyers may have a different price elasticity than frequent consumers.

30. Additionally, the results of Professor Rossi's survey are not generalizable to any hypothetical price increase scenarios other than the five percent price increase he tested. Professor Rossi's estimated price elasticity of demand therefore cannot be generalized.

C. Professor Rossi's Failure to Pretest His Final Survey Instrument Violates Standard Survey Practices

31. Professor Rossi generated four versions of his survey instrument: Initial Draft Survey, Version 1 ("V1"), Version 2 ("V2"), and Version 3 ("V3").¹⁶ In each version, Professor Rossi posed three main questions (Q16, Q17, and Q18) that attempted to elicit respondents' predictions about how they might react to his hypothetical price increase scenario. The wording of the questions and answer options changed substantially across the different versions of the survey instrument.

32. It is standard survey practice to conduct pretests, which involve interviewing a small group of subjects, to identify "questions that respondents have difficulty understanding or interpret differently than the researcher intended" before administering the survey instrument to a

¹⁴ Rossi, ¶ 15.

¹⁵ DX-3233.

¹⁶ See DX-4667, DX-4668.

full sample.¹⁷ Depending on the findings of pretests, changes can be made to the survey instrument. In some cases, these changes are minor (*e.g.*, a word in the question is underlined to ensure respondents read the question accurately), but in others they are extensive (*e.g.*, wording of questions or answer options is significantly altered or new questions or answer options are added to the survey). In the latter scenario, additional pretests, namely interviews of subjects, must be conducted to ensure the alterations to the survey instrument provide the intended clarification and respondents understand and interpret the new questions and answer options appropriately.

33. Professor Rossi pretested his Initial Draft Survey (or conducted an “unstructured pre-test” of this initial version, per Professor Rossi’s non-standard terminology).¹⁸ This included interviews with eight respondents. Based on these interviews, Professor Rossi identified multiple issues with the survey instrument, including respondent confusion about descriptions of the at-issue purchases and the hypothetical price increase scenario.¹⁹ He then made three rounds of *substantive* revisions to his main questions to address these issues, reflected in survey instruments V1, V2, and V3, respectively. **Exhibit 10** lists some of the substantial changes that Professor Rossi made, the version in which he made the changes, and whether respondents were interviewed as part of any pretests *after* these changes were made. But none of these changes were pretested.²⁰

Exhibit 10

Professor Rossi’s Survey Changes

Change to Survey Instrument	First Introduced	In Final Survey	Pre-tested
Added details to explain the hypothetical price increase	V1	✓	No
Changed spending level subject to hypothetical price increase from 12 months to 30 days	V1	✓	No
Changed hypothetical price increase scenario from forward-looking to backward-looking	V3	✓	No
Changed the answer option associated with “Stickers” from “No” to “Yes” in question Q16	V3	✓	No

Source: DX-4667, DX-4668, DX-4670

¹⁷ Krosnick, J. A. (1999), “Survey Research,” *Annual Review of Psychology*, 50, 537–567 (“Krosnick”) at p. 541.

¹⁸ Rossi, ¶¶ 18–19; DX-4665.

¹⁹ Rossi, ¶ 20.

²⁰ In addition to the changes noted in **Exhibit 10**, Professor Rossi also failed to pretest a number of other substantive changes to his survey.

34. Professor Rossi conducted a separate pilot study for each revised version of his survey instrument (*see Exhibit 11*). He uses the misleading, non-standard phrase “structured pre-test” to present these pilot studies as a type of pretest. While pretests involve *interviewing respondents about the survey* in an open-ended manner by a professional interviewer, pilot studies do not involve *interviews* or any direct interaction with respondents, and entail nothing more than administering the survey to a group of respondents and evaluating their collected answers.²¹ Indeed, Professor Rossi affirmed this point in his testimony in another matter, noting that “[p]ilot testing is not the same thing as a pre-test.”²²

Exhibit 11

Professor Rossi’s Survey Revision Process

Fielding Period	Type of Study As Defined by Professor Rossi	Survey Instrument	Number of Respondents	Respondent Interviews
12/23/20 – 1/2/21	Unstructured Pretest	Initial Draft Survey	8	Yes
1/7/21 – 1/8/21	Structured Pretest Version 1	Version 1 (V1)	36	No
1/12/21 – 1/13/21	Structured Pretest Version 2	Version 2 (V2)	38	No
1/19/21 – 1/19/21	Structured Pretest Version 3	Version 3 (V3)	99	No

Source: DX-4665

35. Because Professor Rossi failed to pretest his final survey instrument, he has no assurance that the questions in his final survey instrument were understood and appropriately interpreted by respondents. In fact, the data generated across Professor Rossi’s pilot studies do not support the inference that respondents were not confused; as I show below in **Exhibit 13**, the data suggest that he did not solve the problems he identified, and his finalized survey instrument was still susceptible to respondent confusion and generated unreliable responses. As Professor Rossi stated in another matter, it is “incumbent upon any market survey professional” to “provide proper evidence of a valid pre-test” and, absent this, “the results [from a survey] are not reliable.”²³ Professor Rossi failed to do so here. His survey results are therefore unreliable.

²¹ Ruel, E., Wagner, W. E., and B. J. Gillespie (2016), *The Practice of Survey Research: Theory and Applications*, Thousand Oaks, CA: SAGE Publications, Inc., pp. 114–115.

²² Contingent Rebuttal Witness Statement of Peter E. Rossi, *Certain Gaming and Entertainment Consoles, Related Software, and Components Thereof*, U.S. International Trade Comm., Wash., D.C., Investigation No. 337-TA-752, Nov. 13, 2012 (“Rossi ITC Rebuttal Witness Statement”), ¶ 38; DX-4944.

²³ Rossi ITC Rebuttal Witness Statement, ¶ 57; DX-4944.

D. Question Q16

1. Professor Rossi's Confusing Hypothetical in Question Q16

36. When designing surveys based on hypothetical scenarios, it is necessary to describe the hypothetical in a manner that is consistent with how respondents would experience it in the real world.²⁴ Failing to do so results in respondent confusion and unreliable responses.²⁵ As Professor Rossi has himself explained, using questions untethered from the real world “violates everything that anyone has taught or written about survey research; namely, you have to expose people to stimuli that they can understand and appreciate in the way in which they come to terms with the real world on a day-to-day basis.”²⁶

37. In question Q16, Professor Rossi asked respondents whether they would have kept or changed in-app purchases or subscriptions made on the App Store in the past 30 days in response to a hypothetical price increase (*see Exhibit 12*). However, Professor Rossi did not provide the necessary context for respondents to properly answer this question, and he employed a backward-looking hypothetical that resulted in respondent confusion.

²⁴ See Diamond, S. S., and J. B. Swann, eds. (2012), *Trademark and Deceptive Advertising Surveys: Law, Science, and Design*, Chicago, IL: ABA Publishing (“Diamond and Swann”), at p. 249, (“[T]he suitable method and the determination of whether a survey creates experimental demand effects and biased results, relative to what is likely to occur in reality, depends largely on the pertinent marketplace conditions. That is, whether a survey creates responses that deviate from what naturally occurs in reality depends on whether the manner in which survey respondents are exposed to the stimuli at issue is fundamentally different from what consumers encounter in the marketplace.”).

²⁵ See Diamond and Swann, at p. 259 (“[A] primary criterion for assessing the reliability of surveys and the severity of demand effects is based on the degree to which they alter the fundamental conditions in which the marks or terms at issue are encountered by buyers in reality.”).

²⁶ DX-4946, 258:22–259:2.

Exhibit 12

Recall this situation:

Imagine that, starting 30 days ago, the Apple App Store increased the prices of all IAPs/subscriptions by 5%.

You told us that your spending on IAPs/Subscriptions during the past 30 days was \$4.04. The higher prices mean that the same purchases would have instead cost you \$4.24.

Nothing else about apps or IAPs/subscriptions has changed. Prices at other app stores (e.g. the Google Play store) or websites remain the same.

Thinking about the same 30-day period, would you have made the same purchases of IAPs/subscriptions from the Apple App Store with the higher prices?

☐ Yes, I would have made the same purchases and spent \$4.24

☐ No, I would have changed my purchases and spent less than \$4.24

☐ Not sure what I'd have done

Continue »

Source: PX-2547.35

38. First, Professor Rossi told his respondents that prices in the App Store increased by five percent without specifying the reason for the price increase or providing any information regarding the prices of the at-issue purchases on non-iOS Devices. Based on feedback from his pretest participants, in the second version (V1) of his survey, Professor Rossi added the following language “[n]othing else about your apps or IAPs/subscriptions has changed.”²⁷ This change addresses only *one* potential reason for the price increase (*i.e.*, a change to the app, in-app or subscription that is being purchased) and the question still lacks context for the reason for the price increase. Because Professor Rossi did not interview and ask a single respondent whether the additional language did provide sufficient context, he has no evidence that this source of respondent confusion was properly remedied.

39. Second, Professor Rossi changed the hypothetical scenario posed in question Q16 from a forward-looking exercise (a scenario where the prices of the at-issue purchases respondents had made over the past 30 days would hypothetically increase by five percent in the *future*) to a backward-looking exercise (a scenario where the prices of the at-issue purchases respondents had made over the past 30 days hypothetically increased by five percent *30 days ago*).²⁸ The backward-looking hypothetical in question Q16 does not resemble any decision respondents would make in the real world. In the real world, consumers make decisions on purchases for goods or services they intend to consume immediately or in the future. In contrast, Professor

²⁷ DX-4667.

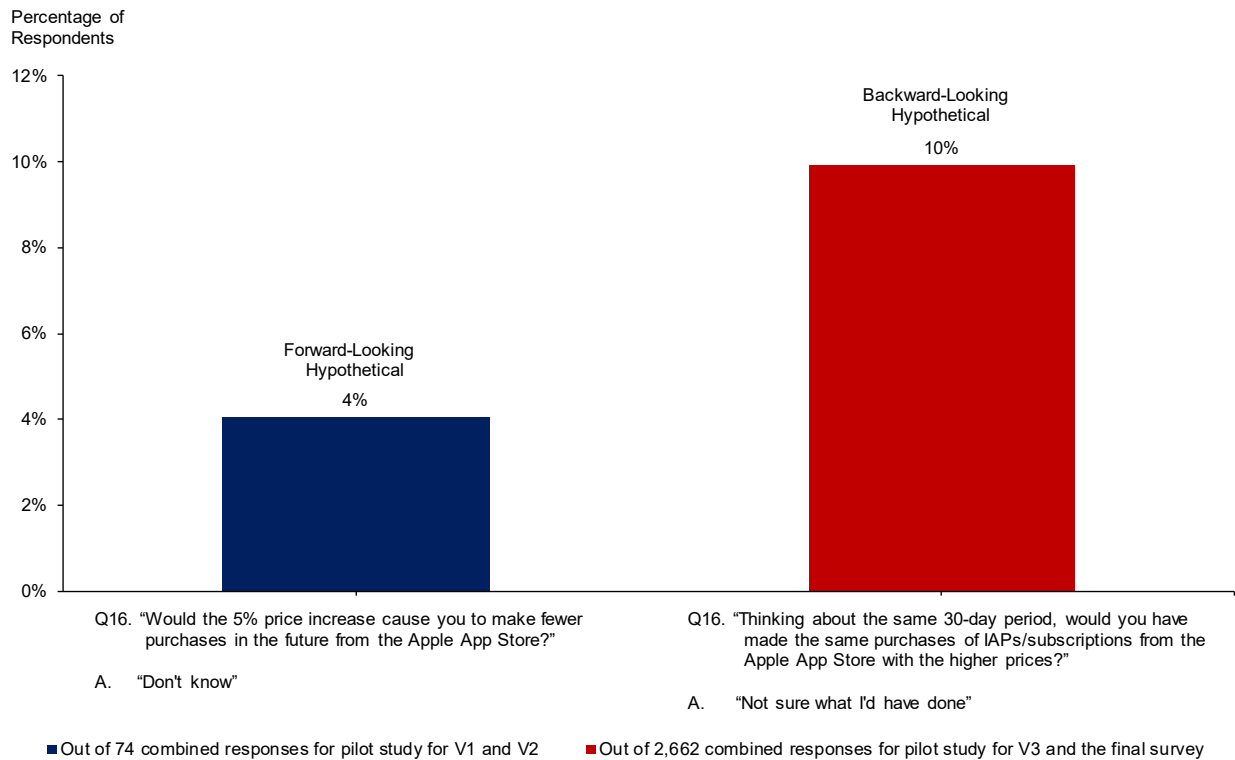
²⁸ DX-4668.

Rossi's respondents were asked to make decisions for purchases they *had already paid for* at a price level that was not a part of their decision-making process at the time.

40. I analyzed the data collected by Professor Rossi in his pilot studies and final survey and concluded that the backward-looking scenario in Professor Rossi's final survey was indeed more confusing to respondents. **Exhibit 13** shows that the share of respondents who chose the don't know / unsure option (a potential indication of confusion²⁹) was substantially higher in the backward-looking scenario (10 percent) than in the forward-looking scenario (4 percent).³⁰

Exhibit 13

Percentage of Non-"Deciders" Identified in Question Q16 Under the Forward-Looking and Backward-Looking Hypothetical Scenarios



Source: DX-4669

²⁹ Literature on surveys shows that respondents are "particularly likely to be attracted to a 'don't know' option when the question is difficult to understand or the respondent is not strongly motivated to carefully report an opinion." Diamond, S. S. (2011), "Reference Guide on Survey Research," in *Reference Manual on Scientific Evidence*, Washington, D. C.: The National Academies Press, 359-423 ("Diamond"), at p. 391.

³⁰ This difference is statistically significant at the five percent level.

41. This increase in no-opinion responses suggests respondents had more difficulty understanding the backward-looking hypothetical compared to the forward-looking hypothetical.

2. Framing of the Hypothetical Scenario and Answer Choices Artificially Inflated the Number of “Stickers” in Question Q16

42. Professor Rossi’s framing of the hypothetical scenario and answer choices in question Q16 are likely to induce many respondents to answer that they would make “the same purchases” and thus inflate the number of “Stickers” in Professor Rossi’s survey. Analysis of data from Professor Rossi’s pilot studies and his final survey instrument demonstrates that his questionnaire design choices caused the percentage of “Stickers” to increase by more than 40 percent in proportional terms, from 51 percent to 73 percent (*see Exhibit 15* below).

a) Acquiescence Bias

43. Academic literature has shown that respondents are more likely to answer “yes” than “no,” or otherwise agree with the question posed, all else equal. This tendency is sometimes referred to as acquiescence bias or the yea-saying response tendency.³¹ In fact, one of the authorities that Professor Rossi has referenced in this matter warns that “acquiescence, ‘the tendency to endorse any assertion made in a question, regardless of its content,’ is a systematic source of bias.”³²

44. Professor Rossi framed question Q16 as a yes/no question. In his initial survey, “No” indicated that a respondent would not change past purchases from the App Store, while “Yes” indicated that a respondent would change past purchases. In his third round of revisions to his survey instrument, Professor Rossi reversed the meaning of the “Yes” and “No” options (*see Exhibit 14*), so that leaving past purchases from the App Store unchanged was associated with a “Yes” answer.³³ Acquiescence bias suggests the percentage of “Stickers” should increase as a result, which was indeed the case.

³¹ Hurd, M. (1999), “Anchoring and Acquiescence Bias in Measuring Assets in Household Surveys,” *Journal of Risk and Uncertainty*, 19, 1, 111–136 at pp. 116–117; Diamond and Swann, at p. 274, (“The reason a question that may be answered by a mere ‘yes’ or ‘no’ is likely to be leading is because, all other things being equal, respondents – generally agreeable people who have agreed to participate in the first place – are more inclined to be agreeable and answer ‘yes’ than to answer ‘no.’ Given this ‘yea-saying response tendency,’ all other things being equal, yes/no questions are much more likely to garner answers of yes rather than no. [...] [T]he use of yes/no questions can pose serious problems.”).

³² Diamond, at p. 394.

³³ Professor Rossi defines respondents who said that they would have changed their purchases in response to the hypothetical price increase as “Decrementers.” Rossi, ¶ 11.

Exhibit 14

Reversal of Answer Choice Identifying "Stickers" in Question Q16

Professor Rossi's Classification	Answer Choices in Initial Draft Survey, V1, and V2	Answer Choices in V3 and Final Survey
"Sticker"	No , the price increase would not cause me to make fewer purchases from the Apple App Store	Yes , I would have made the same purchases and spent \$16.78
"Decrementer"	Yes , the price increase would cause me to make fewer purchases from the Apple App Store	No , I would have changed my purchases and spent less than \$16.78

Source: DX-4670

45. Professor Rossi explained that he reversed the "Yes" and "No" options to correct a "double negative,"³⁴ but his pretests of the Initial Draft Survey provided no evidence that respondents were confused by this phrasing, and he did not implement this change until the fourth version of his survey instrument (*i.e.*, V3). Nor did he interview any respondents (or conduct a pretest) after he changed these answer options.

b) Endowment Effect

46. It is a well-established finding in consumer behavior research that people often demand more to give up something they already own than they would pay to acquire it. This phenomenon is known as the endowment effect.³⁵ Pursuant to this, people will consider foregone gains less painful than perceived losses.

47. When Professor Rossi asked respondents in question Q16 whether they would have changed their past purchases (or changed purchases that the respondents were already "endowed" with), respondents were in effect asked to second-guess a decision they had already made and benefited from. Thus, respondents were asked whether they would have given up a purchase whose benefits they had already enjoyed. The endowment effect highlights that respondents would stick to the purchases they had already made.

c) Impact of Framing of the Hypothetical Scenario and Answer Choices

48. To assess the impact of Professor Rossi's changes to question Q16, I analyzed the data collected by Professor Rossi and compared (a) the percentage of "Stickers" in pilot studies for

³⁴ Rossi, ¶ 20.

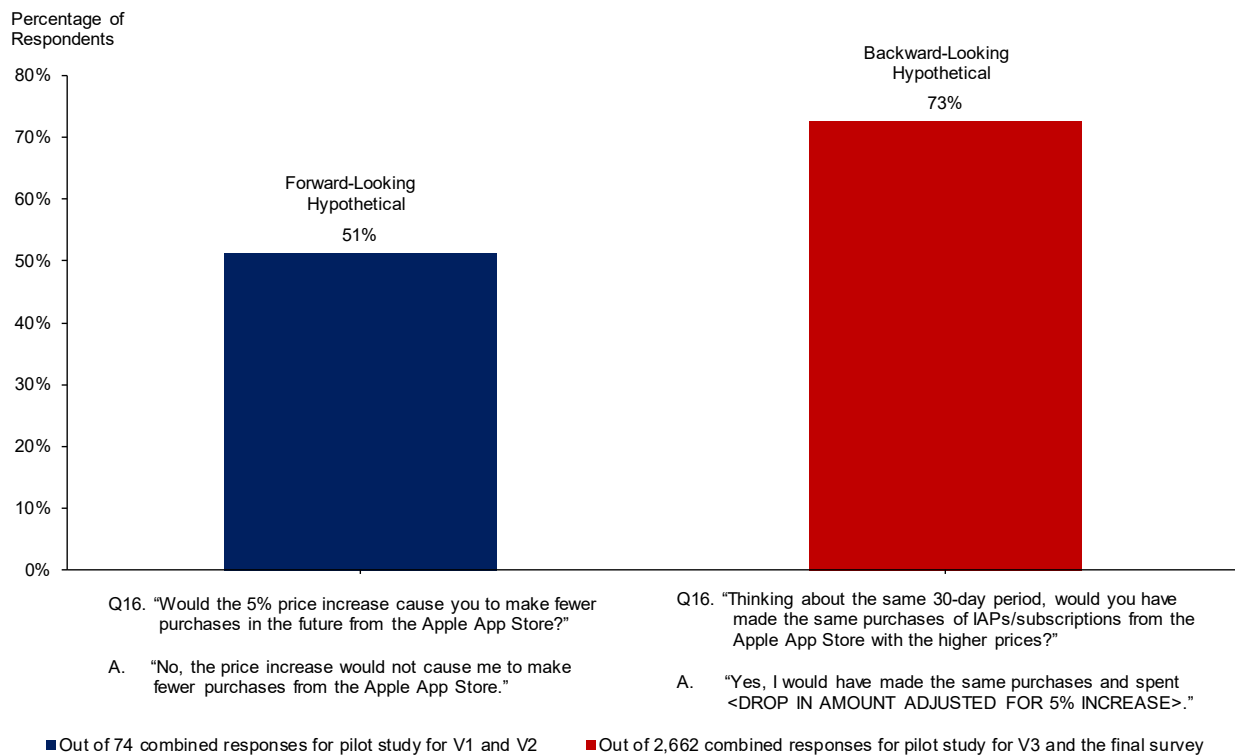
³⁵ See Kahneman, D., J. Knetsch, and R. H. Thaler (1991), "Anomalies: The Endowment Effect, Loss Aversion, and Status Quo Bias," *Journal of Economic Perspectives*, 5, 1, 193–206.

V1 and V2 of Professor Rossi's survey instrument, in which the "No" option corresponded with "Stickers" and the price increase hypothetical was forward-looking with (b) the percentage of "Stickers" in the pilot study for V3 of Professor Rossi's survey instrument and the final survey instrument, in which the "Yes" option corresponded with "Stickers" and the price increase hypothetical was backward-looking.

49. As **Exhibit 15** demonstrates, the percentage of "Stickers" increased dramatically from 51 percent in V1 and V2 of the survey to 73 percent in V3 and the final survey.³⁶ The difference between the two groups is statistically significant at the five percent level.

Exhibit 15

Percentage of "Stickers" Identified in Question Q16 Under the Forward-Looking and Backward-Looking Hypothetical Scenarios



Source: DX-4671

³⁶ The figure shows that the versions with the *backward-looking* framing (V3 and final survey instrument) and where the "Yes" option corresponds to "Stickers" yielded significantly higher percentages of respondents who chose to make the same purchases (73 percent) than those in the versions with the *forward-looking* framing and where the "No" option corresponds to "Stickers" (51 percent, in V1 and V2).

50. Finally, Professor Rossi's hypothetical price increase was restricted to purchases made in the past 30 days, resulting in a *trivial nominal price increase* for the vast majority of respondents; more than 80 percent of respondents who completed question Q16 in Professor Rossi's survey were presented with a price increase of less than \$2.³⁷ Whereas in the Initial Draft Survey Professor Rossi showed respondents an estimated annual amount of aggregate spending on in-app purchases and subscriptions, he limited the spending to the significantly narrower 30-day window in the later revisions and the final survey instrument. This change (which significantly lowers the hypothetical increase in the purchase price) likely influenced respondents' predictions of how they would react to Professor Rossi's hypothetical price increase and induced many respondents to make "the same purchases" (*i.e.*, inflated the number of "Stickers").

E. Question Q17

51. For respondents who indicated they would have changed their purchases, Professor Rossi asked in question Q17 what the respondents would have done to spend less in the App Store, after the hypothetical price increase. In question Q17, Professor Rossi overemphasized the need to use a different device as well as the costs of switching devices, and presented answer choices that were vague, artificially narrow, and did not properly reflect real-world choices. Responses to this question are therefore likely to understate the willingness of real-world consumers to reduce spending in Professor Rossi's hypothetical price increase scenario by making payments through means other than the App Store (*e.g.*, using the web browser on an iPhone and making the purchase on the app developer's website or using a non-iOS Device, such as a laptop, to make the purchase).

³⁷ DX-4672.

Exhibit 16

What would you have done to spend less than \$4.24 in the Apple App Store?

In considering your response, keep in mind potential costs and time required to shift purchases to other devices. [See more detail.](#)

(Check all that apply)

☐ Would have kept my IAP/subscription spending in the Apple App Store but spent less than \$4.24

☐ Would have shifted some or all of my IAP/subscription spending to my other existing devices (not my iPhone)

☐ Would have shifted some or all of my IAP/subscription spending to a new device (not an iPhone or iPad)

☐ None of the above

[Continue »](#)

For example, the cost of the new device and accessories, installing and/or repurchasing apps from a different app store, compatibility with other devices and learning how to use new features of the device and the apps.

end less than \$4.24 in the Apple App Store?

In considering your response, keep in mind potential costs and time required to shift purchases to other devices. [See more detail.](#)

Source: PX-2547.36–37

52. Specifically, Professor Rossi instructed his respondents to “keep in mind...” potential switching costs associated with shifting purchases to other devices and provided a link to additional information about switching costs (*see Exhibit 16*). While Professor Rossi included prominent, lengthy reminders about switching costs, he failed to provide relevant context for what “shift[ing] purchases” entails and whether such a shift always requires a shift to other devices. Consequently, he implicitly and misleadingly positioned the decision as one of using an iPhone or iPad versus switching to a different device entirely.³⁸ Professor Rossi therefore presented the alternatives to making payments in the App Store as the less attractive and more costly choices for his survey respondents (*e.g.*, his question suggests that a respondent would have to buy and use a new Android smartphone or a tablet to avoid making the payment through the App Store). As a result, question Q17 biases respondents toward keeping payments in the

³⁸ While Professor Rossi includes a “None of the above” option, he provides no evidence that his respondents would properly understand that using the web browser on an iPhone or iPad and making the purchase on the app developer’s website would be covered under this option.

App Store and not considering other means for payments in order to reduce spending in the hypothetical price increase scenario.

53. First, while Professor Rossi specifically reminded respondents of the “costs ... to shift purchases to other devices,” he did not explain how such a shift could result in spending less. In fact, only the “Sticker” answer choice (“Would have kept my IAP/subscription spending in the Apple App Store but spent less...”) mentions spending less. Neither of the answer choices that involve shifting spending to other devices mentions spending less. Professor Rossi made no attempt to explain *how* these answer choices could be relevant to spending less.

54. Second, because the answer choices that Professor Rossi presented in question Q17 were vague, artificially narrow, and did not properly reflect real-world choices, results for question Q17 likely understate the willingness of real-world consumers to reduce their spending by using means other than making the payment through the App Store. For example, Professor Rossi:

- a. Omitted alternative methods for reducing spending, such as making purchases through a website using an iOS Device.³⁹
- b. Failed to explain that respondents could continue to consume purchased products (e.g., digital newspaper content) on their iOS Devices if they chose to make payments for these products (e.g., a digital newspaper subscription) using other devices. For example, Professor Rossi described device compatibility costs and learning how to use new device features and apps as part of his switching costs. Many of these costs would not be relevant for making payments. Discussing switching costs in this manner may have led respondents to believe that purchased content would need to be consumed from a device other than the respondent’s iPhone or iPad.
- c. Framed question Q17 such that respondents had to make an immediate switch decision to fully or partially avoid the hypothetical price increase, (e.g., immediately purchasing a new Android phone as a remedy for the hypothetical price increase). As a result, such an immediate switch decision would strike many respondents as confusing and unrealistic.

F. Question Q18

55. For respondents who indicated in question Q16 that they would have changed their purchases and spent less, Professor Rossi asked, in question Q18, by how much they would reduce their spending (*see Exhibit 17*). He again failed to provide respondents with a realistic setting and proper context. Nor did he allow respondents to indicate that they could not answer this question because they were unsure or did not know (*i.e.*, he forced all respondents to provide

³⁹ See “Netflix Stops Offering In-App Subscriptions for New and Returning Customers on iOS,” *The Verge*, December 28, 2018, <https://www.theverge.com/2018/12/28/18159373/netflix-in-app-subscriptions-iphone-ipad-ios-apple>, access date: 3/14/2021; DX-5308, Section 3.1.3.

a monetary value). As a result, responses to question Q18 and Professor Rossi's estimate of price elasticity of demand are unreliable.

Exhibit 17

To recap the situation:

Past 30 days
Total spending: \$4.04

Situation
Price increase (5%): \$0.20
Same purchases would be: \$4.24

You told us that in this situation you would have spent less than \$4.24.

Enter below your estimate of HOW MUCH LESS you would have spent. In making this estimate, be sure to think about how you would have changed your purchases.

\$ 1.10

You have entered \$1.10 which means that your TOTAL SPENDING would have been: \$3.14

☒ Yes, this is correct
(If not, please revise your estimated amount and then confirm)

Continue »

Source: PX-2547.40

56. In the real world, the amount consumers pay would depend on their decision regarding what to purchase (e.g., keep or discontinue an existing subscription) and the means through which to make the payment for these purchases (e.g., pay via the App Store, pay using app developer's website using an iOS device or a non-iOS device). Therefore, real world consumers would not be able to reduce their spending in the App Store by any random amount, as they were essentially asked to do in Professor Rossi's survey.

57. Further, Professor Rossi's failure to provide a "don't know / unsure" option for respondents violates standard practices in survey research.⁴⁰ Though respondents indicated they would spend less in previous questions, it is highly likely that some respondents did not know how much less they would have spent in the App Store (in particular because this type of

⁴⁰ See Diamond, at p. 390 ("[T]he survey can use a quasi-filter question to reduce guessing by providing 'don't know' or 'no opinion' options as part of the question ... [b]y signaling to the respondent that it is appropriate not to have an opinion, the question reduces the demand for an answer and, as a result, the inclination to hazard a guess just to comply"). See also Krosnick, at p. 557.

decision is not made in the real world). By forcing all of his respondents to provide an answer, Professor Rossi elicited unreliable responses.

G. Professor Rossi's Purported Evidence of Representativeness Is Misleading

58. Professor Rossi provided several comparisons of his survey sample to external data to purportedly demonstrate that “the sample of respondents who passed the Reliability Test was representative of the underlying target population of iOS device users who make at-issue purchases.”⁴¹ However, the tests he conducted provide a false impression of the representativeness of his sample.

59. Specifically, Professor Rossi compared device distribution and gender distribution of respondents in his data to the device distribution and gender distribution of iPhone users in a survey presented in a RBC Capital Markets securities analyst report. The choice of the RBC Capital Markets survey as a benchmark is arbitrary for two reasons:

- a. The RBC Capital Markets survey does not reflect the relevant target population as defined by Professor Rossi since it is not limited to those who made at-issue purchases and is limited to iPhone users only.
- b. The RBC Capital Markets survey was conducted by a securities analyst via *SurveyMonkey*, and the analyst report that presented this survey did not disclose information about the survey methodology, such as respondent selection or the specific questions asked. Without this information, Professor Rossi has no basis to assume that this survey accurately reflects the relevant population.⁴²

60. In the second comparison, Professor Rossi compared the median in-app purchases of his survey respondents to the median in-app purchases in Apple Transaction Data. However, this specific comparison of the datasets does not ensure Professor Rossi's data matches the Apple Transaction Data more generally. Professor Rossi's own analysis shows that the comparison is not robust. For example, the 75th percentile of his final survey sample (“Completers”) spent \$25, while the 75th percentile in the Apple Transaction Data spent \$34.92.⁴³

⁴¹ Rossi, ¶¶ 47–49.

⁴² PX-2544.

⁴³ PX-1085.

V. Oath

I declare under penalty of perjury under the laws of the United States that the foregoing is true and correct.

Respectfully submitted,



Dominique Hanssens

April 23, 2021

Date

8108 words